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# PSYCHE.

## THE FOSSIL CEROPALIDÆ OF FLORISSANT, COLORADO.

BY S. A. ROHWER, BOULDER, COLORADO.

THERE have been four fossil Ceropalids described by Prof. T. D. A. Cockerell from Florissant, and three more are added in this paper. The fossil Ceropalids found at Florissant do not seem to be very close to the recent ones found there during the summers of 1907 and 1908. The recent ones are small (none of them 10 mm. long), mostly black wasps—quite the ordinary kind for the lower Canadian Life Zone. The fossil ones, on the other hand, are rather large, robust wasps, like those found to-day in the eastern states and Mexico. Some of them (*Agenia saxigena*, *Salina florissantensis* and *S. scudderi*) have the wings with two dark bands, a character which is well developed in the species living to-day in Central America and Mexico. So far none have been found with very dark wings, a character found in most of the large species of United States.

The following table will separate the Florissant fossil Ceropalids:—

Abdomen shortly petiolate; (wings clouded beyond the stigma)

*Ceropalites infelix* Ckll.

Abdomen sessile . . . . . 1.

1. Second cubital cell on the radius distinctly greater than the third on the same  
nervure; (wings clouded beyond the stigma) . . . . . *Agenia cockerellæ* Roh.

Second cubital cell on the radius not greater than the third . . . . . 2.

2. Second cubital cell small, but little more than half as long as the third on the  
radius; metathorax transversely wrinkled; ferruginous; cloud about the stigma  
not entering the radial cell . . . . . *Salix senex* Roh.

Second cubital cell larger; metathorax not transversely wrinkled; head and  
thorax at least black; wings differently marked . . . . . 3.

3. Wings clouded beyond the stigma; large black species . . . . . *Salix laminarum* Roh.

Wings with an apical cloud; and also a cloud on the basal nervure . . . . . 4.

4. Length 15 mm.; second and third cubital cells on the radius about the same length; robust, black species; anterior wing 10 mm. long.

*Salix florissantensis* (Ckll.)

- Length less than 12 mm.; third cubital cell distinctly longer than the second 5.

5. Slender black species; length 10 mm.; length of anterior wing 6 mm.; head subquadrate; basal n. 120  $\mu$  basad of tr. med. *Salix scudderi* (Ckll.)

Robust species with abdomen a little paler than thorax; length 11 mm.; length of anterior wing 9 mm.; head subtransverse; basal n. 680  $\mu$  basad of tran. med.

*Agenia saxigena* Ckll.

#### AGENIA SAXIGENA Ckll.

Besides the reverse of Prof. Cockerell's type, I have seen a specimen of this species from Fossil Stump Hill, 1907 (W. P. Cockerell).

#### AGENIA COCKERELLE n. sp.

♀. Length about 13 mm.; length of the anterior wing 7.5 mm. Head about the same width as the thorax, normal for this broad type. Head and thorax subtly sculptured, at the sides of the thorax it is slightly aciculate. Legs moderately robust; fore femora not swollen, normal; middle tibiae without spines, and with the longer spur almost as long as the basitarsus; hind and fore tibiae indistinct. Radial cell broadest where the second tr. cu. joins the radius; stigma very small, only the apex remaining; first tr. cu. strongly curved toward the base of the wing, making the second cubital cell much broader on the cubitus; second tr. cu. almost straight; third tr. cu. on the lower part strongly curving toward the apex of the wing, making the third cubital cell much broader on the cubitus; second cubital cell much larger than the third, receiving the first recur. n. distinctly beyond the middle; third cubital cell receiving the second recur. n. somewhat beyond the middle; first discoidal cell long and acute at the apex, distinctly but not markedly longer than the first cubital; tran. med. not basad of the basal nervure, but its exact position is hidden by a leg. Abdomen sessile, broad, impunctate. Head and thorax black; abdomen and legs rufous. Basal half of wings hyaline, apical half dark fuscous; venation dark brown. The following measurements are in  $\mu$ :—

Length of radial cell about	1275.
Width of radial cell at the second tr. cu.	306
Third tr. cu. from costa on radius	782
Length of first cubital cell on cu.	1615.
Length of second cubital cell on radius	595.

Length of second cubital cell on cubitus	1122.
Length of third cubital cell on radius	306.
Length of third cubital cell on cubitus	782.
Distance from second recur. n. to third tr. cu.	306.
Length of the second tr. cu.	306.
Distance of the first recur. n. from first tr. cu.	561.

*Habitat*:—The tertiary shales of Florissant, Colorado; at station 11 (the north end of Fossil Stump Hill). Named after Mrs. W. P. Cockerell who collected the specimen in 1907. Type in the University of Colorado.

This species is at once distinguished from the other fossil species of Florissant (*Salix florissantensis* (Ckll.), *S. scudderi* (Ckll.) and *Agenia saxigena* Ckll.) by the larger second cubital cell, the different color of the wings and body and the larger size (*Salix florissantensis* Ckll. is 15 mm. long). The short wings should help in determining this species. A search through the literature and among the species in my collection fails to bring to light any species closely related to this one, that is at present known to inhabit the Rocky Mountain Region. It does however show that species similarly colored, and similar in some other respect are to-day found in the Atlantic states and in Mexico. Such allies are *Agenia congrua* (Cress.), *Agenia longula* (Cress.) and *Agenia accepta* (Cress.). The venation resembles that of *Pseudogenia montivaga* Cam. from Mexico as figured in the Biol. Centr. Am. Hymenoptera, Vol. ii, plate 10, fig. 9.

#### SALIX SENEX n. sp.

♀. Length about 14 mm.; length of the anterior wing 9.5 mm. Form robust. Head of the usual subtransverse type. Sculpture subtle; postscutellum not strongly if at all obliquely striated; metathorax transversely wrinkled. Legs rather robust; more or less spinose. Abdomen stout, a little longer than the head and thorax united. Stigma distinct; radial cell reaching the costa; second cubital cell very small, almost quadrate; second recur. n. received by the second cubital basad of the middle; third cubital cell large, wider below, receiving the second recurrent a little beyond the basal third; first discoidal long, longer than the first cubital; transverse median beyond basal as far as the length of the basal below the cubitus. Color ferruginous, apparently without black markings. Wings hyaline, with a cloud below the stigma, but not in the radial cell; venation brownish. The following measurements are in  $\mu$ :—

Length of the stigma	850.
Breadth of the stigma	187.

Basal nervure basad of the stigma, about . . . . .	1700.
Length of ba. n. above origin of cu. . . . .	306.
Length of ba. n. below origin of cu. . . . .	680.
Ba. n. basad of the tr. med. . . . .	680.
Length of tr. med. . . . .	340.
Length of first cubital on cu., about . . . . .	2210.
Length of first cubital on rad. . . . .	204.
Length of second cubital on cu. . . . .	731.
Length of second cubital on rad. . . . .	595.
Length of third cubital on cu. . . . .	1785.
Length of third cubital on rad. . . . .	1105.
Distance from 3tr. cu. to costa on rad. . . . .	595.
First tr. cu. basad of first recur. n. . . . .	306.
Second tr. cu. basad of second recur. n. . . . .	680.

*Habitat*:—The tertiary shales of Florissant, Colorado, Station 14 (three-fourths of a mile southwest of the town), 1908. Collector unknown. Type in the University of Colorado.

The general habitus of this species is much the same as *Anoplius* (*Arachnophroctonus Ashm.*) *ferrugineus* (Say), but it differs in a number of ways from that species, especially in the venation. It has a number of points in common with *Salius fenestratus* Sm. (Sylhet) especially in the wrinkled metathorax and position of the tran. med. It is more closely allied to *Salius florissantensis* (Ckll.) than any other described fossil Ceropalid but it may be known from that species by the much smaller second cubital cell, the absence of a cloud along the basal nervure, the wrinkled metathorax, the absence of striae on the postscutellum, and the ferruginous color.

#### *SALIUS LAMINARUM* n. sp.

♀. Length about 15 mm.; length of anterior wing 8.5 mm. Robust. Head of the usual subtransverse type. Sculpture subtle, metathorax not wrinkled or postscutellum obliquely striated. Scape of the antennae elongate, cylindrical; the rest of the antennal joints are not clearly defined in the fossil. Legs long and robust, spinose; longer spur of hind tibiae much shorter than basitarsus. Stigma normal; radial cell reaching the costa; second cubital on rad. nearly as long as the third; first and second tr. cubiti bent basally on the lower part; third tr. cu. curved outwardly; first recur. n. received in the middle of second cubital cell; second recur. n. received a little beyond the middle of third; tran. med. considerable distance beyond the basal nervure. Abdomen long, somewhat flattened not nearly as conical as in

*S. senex*. Color entirely black. Wings hyaline; beyond the middle of the stigma dusky.

The following measurements are in  $\mu$ :—

Length of stigma . . . . .	850.
Width of stigma, about . . . . .	255.
Basal nervure basad of stigma . . . . .	1870.
Length of first cubital cell . . . . .	2210.
Length of first cubital on rad. . . . .	255.
Length of second cubital cell on rad. . . . .	918.
Length of second cubital cell on cu. . . . .	1020.
Length of third cubital cell on rad. . . . .	969.
Length of third cubital cell on cu. . . . .	1275.
Distance from third tr. cu. to costa on rad. . . . .	716.
First tran. cu. basad of first recur. n. . . . .	510.
Second tr. cu. basad of second recur. n. . . . .	680.
Basal nervure above cu. . . . .	306.
Basal nervure below cu. . . . .	680.

*Habitat*:—Tertiary shales, Florissant, Colorado, Station 14 (three-fourths of a mile southwest of the town) 1908, (S. A. Rohwer). Type in the University of Colorado.

This species is most closely related to *Salius florissantensis* (Ckll.), but it is easily known from that species by the different markings of the wings. It is also related to *Salius senex* Roh., but that species has a smaller second cubital cell, and the apical part of the wings are not dark. I do not know a recent species found in North America which is just like *S. laninarius* in the flattened abdomen.

#### *SALIUS SCUDDERI* (Ckll.).

♀. A slender species with a subquadrate head. Sculpture subtle. Antennal joints cylindrical, well defined, apical joint short. Wings with a cloud beyond the stigma, but not extending to the apex or bottom of the wings, and a smaller one on the basal nervure.

#### *SALIUS FLORISSANTENSIS* (Ckll.).

A large species. Sculpture subtle except the postscutellum which is obliquely striated. Wings with a cloud below and in front of the stigma, and one on the basal nervure.

The following is a list of the fossil Ceropalids of the world:

*PEPSIS* sp. Burmeister.—Baltic Amber; Lower Oligocene. Handbuch Ent. I, p. 636, 1832.

- POMPIIUS* sp. Brischke.— Baltic Amber; lower Oligocene. Schr. Nat. Ges. Danzig. n. f. Vol. VI, p. 278, 1886.
- PROCNEMIS* sp. Schoberlin.— Oeningen in Baden; upper Miocene. Soc. Ent. III, p. 61, 1888.
- ANOPIUS INDURATUS* (Heer) Roh.— Oeningen in Baden; upper Miocene. *Pompius induratus* Heer; Ins. Oen. II, 165, f. 13, p. 10, 1849.
- SALUS FLORISSANTENSIS* (Ckll.) Roh.— Florissant, Colo.; Miocene. *Hemipogonius florissantensis* Ckll.; Bull. Mus. Comp. Zool., Vol. L, No. 2, p. 52.
- SALUS SCUDDERI* (Ckll.) Roh.— Florissant, Colo.; Miocene. *Hemipogonius scudderi* Ckll.; Bull. Mus. Comp. Zool., Vol. L, No. 2, p. 53, 1906.
- CEROPALITES INFELIX* Ckll.— Florissant, Colo.; Miocene. Bull. Mus. Comp. Zool., Vol. L, No. 2, p. 53, 1906.
- AGENIA SAXIGENA* Ckll.— Florissant, Colo.; Miocene. Am. Jn. Sc., Vol. XXV, March 1908, p. 229.
- AGENIA COCKERELLE* Roh.— Florissant, Colo.; Miocene.
- SALUS SENEX* Roh.— Florissant, Colo.; Miocene.
- SALUS LAMINARUM* Roh.— Florissant, Colo.; Miocene.

I wish to thank Prof. T. D. A. Cockerell for the pleasure of studying these most interesting fossils, for the use of his manuscript notes on the species he described, and for going over my manuscript.

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*ZEUZERA PYRINA* IN BOSTON.— My friend R. W. Curtis, Assistant Superintendent of the Arnold Arboretum, found on the 18th of January, 1909, a full-grown and therefore two years old caterpillar of *Zeuzera pyrina* Linn. in the trunk of a *Quercus palustris* Du Roi, which was broken by a storm. He had already made the same discovery one year ago in another tree, but which one he does not remember. Dr. E. P. Felt in his work on Forest Insects (New York State Museum Memoir Vol. I.) does not give Massachusetts as included in the distribution of *Z. pyrina*. According to verbal information given me several adults have been observed in the vicinity of Boston, Mass., in the past three years, but it has not yet been stated that *Z. pyrina* has advanced in Massachusetts to a regular brood. The findings made by Mr. Curtis prove that the breeding of the species in the neighbourhood of Boston must have taken place for the first time in 1906, if no earlier record of a brood has been made elsewhere.

WILLIAM REIFF,  
Bussey Institution of Harvard University.